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MARCH 1998

REAPPRAISAL

SHELLFISH GROWING AREA 44-45

PECK BEACH TO BRIGANTINE

1992-1996

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1992-1996



New Jersey Department of Environmental Protection
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**This report was funded
by a State General Appropriation
and the
Federal Clean Water Act**

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EXECUTIVE SUMMARY

This Reappraisal finds the current Sanitary Survey for this region to be representative of conditions. In particular, the report recommends continuation of the 390 acre and 3,600 acre Prohibited areas surrounding the ocean discharging storm water outfalls and the Atlantic County Utilities Authority's outfall, respectively.

INTRODUCTION

This report is part of a series of studies having a dual purpose. The first and primary purpose is to comply with the guidelines of the National Shellfish Sanitation Program (NSSP) that are established by the Interstate Shellfish Sanitation Conference (ISSC). The second purpose is to input the State Water Quality Inventory Report, which is prepared pursuant to Section 305(b) of the Federal Clean Water Act (P.L. 95-217).

The information contained in the growing area reports is also used for the New Jersey State Water Quality Inventory Report (305b) which provides an assessment to Congress every two years of current water quality conditions in the State's major rivers, lakes, estuaries, and ocean waters. The reports provide valuable information for the 305(b) report, which describes the waters that are attaining state designated water uses and national clean water goals; the pollution problems identified in surface waters; and the actual or potential sources of pollution. Similarly, the reports utilize relevant information contained in the 305(b) report, since the latter assessments are based on instream monitoring data (temperature, oxygen, pH, total and fecal coliform bacteria, nutrients, solids, ammonia and metals), land-use profiles, drainage basin characteristics and other pollution source information.

From the perspective of the Shellfish Classification Program, the reciprocal use of water quality information from reports represent two sides of the same coin: the growing area report focuses on the estuary itself, while the 305(b) report describes the watershed that drains to that estuary.

The Department participates in a cooperative initiative (NEPPS program) with the USEPA which emphasizes ongoing evaluation of issues associated with environmental regulation, including assessing impacts on water bodies and measuring improvements in various indicators of environmental health. The shellfish growing area reports are intended to provide a brief assessment of the growing area, with particular emphasis on those factors that affect the quantity and quality of the shellfish resource. As the Department implements a comprehensive watershed management program in conjunction with the NEPPS initiative, the shellfish growing area reports provide valuable information on the overall quality of the saline waters in the most downstream sections of each major watershed. In addition, the reports assess the quality of the biological resource and provide a reliable indicator of potential areas of concern and/or areas where additional information is needed to accurately assess watershed dynamics.

As a brief history, the NSSP developed from public health principles and program controls formulated at the original conference on shellfish sanitation called by the Surgeon General of the United States Public Health Service in 1925. This conference was called after oysters were implicated in causing over 1,500 cases of typhoid fever and 150 deaths in 1924. The tripartite cooperative program (federal, state and shellfish industry) has updated the program procedures and guidelines through workshops held periodically until 1977. Because of concern by many states that the NSSP guidelines were not being enforced uniformly, a delegation of state shellfish officials from 22 states met in 1982 in Annapolis, Maryland, and formed the ISSC. The first annual meeting was held in 1983 and continues to meet annually at various locations throughout the United States.

Parts I and II of the NSSP Manual set forth the principles and requirements for the sanitary control of shellfish produced and shipped in interstate commerce in the United States. They provide basis used by the Federal Food and Drug Administration (FDA) in evaluating state shellfish sanitation programs. There are five major points on which the state is evaluated by the FDA include:

1. The classification of all actual and potential shellfish growing areas as to their suitability for shellfish harvesting.
2. The control of the harvesting of shellfish from areas which are classified as restricted, prohibited or otherwise closed.
3. The regulation and supervision of shellfish resource recovery programs.
4. The ability to restrict the harvest of shellfish from areas in a public health emergency, and
5. Prevent the sale, shipment or possession of shellfish which cannot be identified as being produced in accordance with the NSSP and have the ability to condemn, seize or embargo such shellfish.

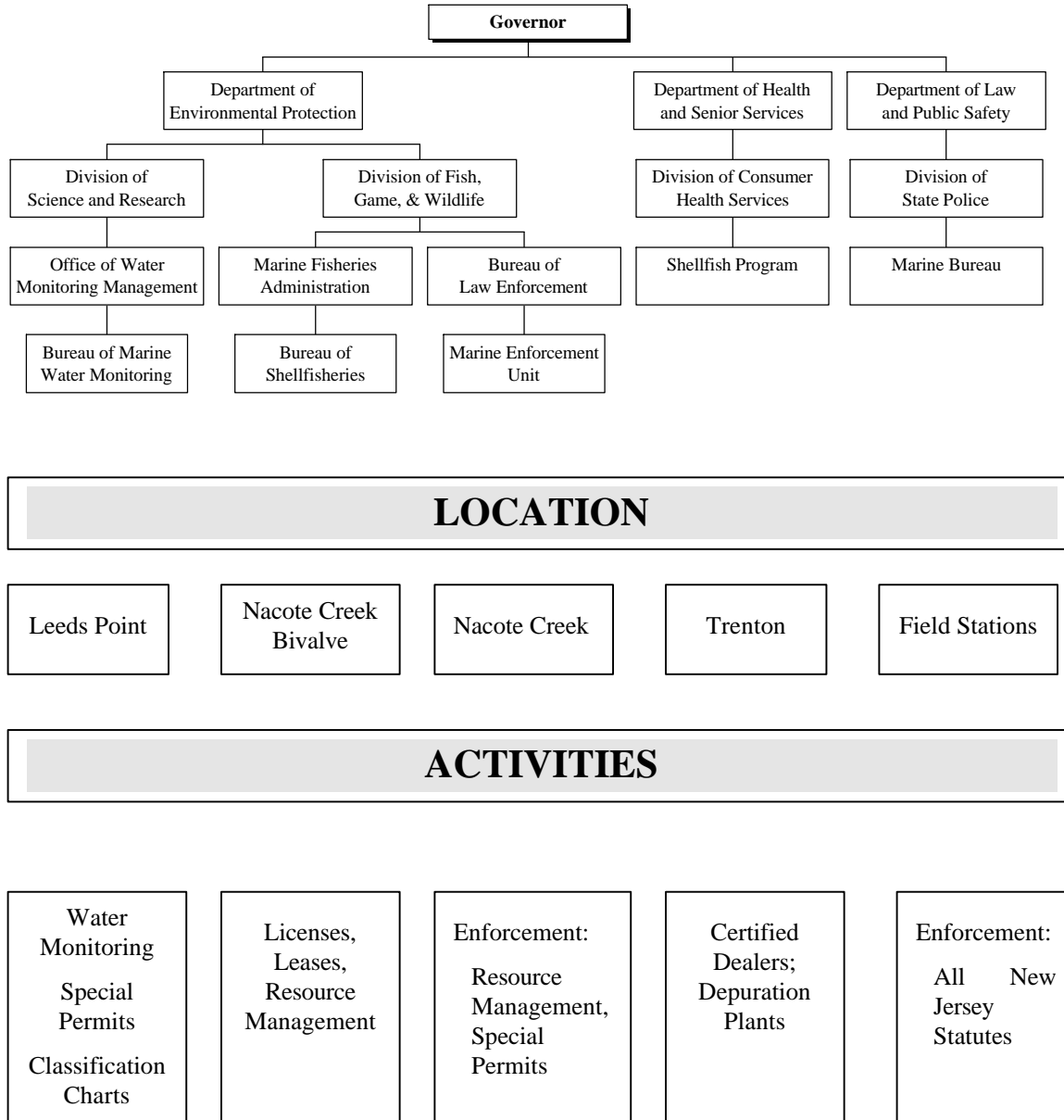
The authority to carry out these functions is divided between the Department of Environmental Protection (DEP), the Department of Health and Senior Services and the Department of Law and Public Safety. The Bureau of Marine Water Monitoring (BMWM) under the authority of N.J.S.A. 58:24 classifies the shellfish growing waters and administers the special resource recovery programs. Regulations delineating the growing areas are promulgated at N.J.A.C. 7:12 and are revised annually. Special Permit rules are also found at N.J.A.C. 7:12 and are revised as necessary.

The Bureau of Shellfisheries in the Division of Fish, Game and Wildlife issues harvesting licenses and leases for shellfish grounds under the Authority of N.J.S.A. 50:2 and N.J.A.C. 7:25. This bureau in conjunction with the BMWM administers the Hard Clam Relay Program.

The Bureau of Law Enforcement in the DEP (Division of Fish, Game, and Wildlife) and the Division of State Police in the Department of Law and Public Safety enforce the provisions of the statutes and rules mentioned above.

The Department of Health is responsible for the certification of wholesale shellfish establishments and in conjunction with the BMWB, administers the depuration program.

Figure 1: State of New Jersey Shellfish Agencies



Emphasis is placed on the sanitary control of shellfish because of the direct relationship between pollution of shellfish growing areas and the transmission of diseases to humans. Shellfish borne infectious diseases are generally transmitted via a fecal-oral route. The pathway is complex and quite circuitous. The cycle usually begins with fecal contamination of the shellfish growing waters. Sources of such contamination are many and varied. Contamination reaches the waterways via runoff and direct discharges.

Clams, oysters and mussels pump large quantities of water through their bodies during the normal feeding process. During this process the shellfish also concentrate microorganisms, which may include pathogenic microbes, and toxic heavy metals/chemicals. It is imperative that a system is in place to reduce the human health risk of consuming shellfish from areas of contamination.

Accurate classifications of shellfish growing areas are completed through a comprehensive sanitary survey. The principal components of the sanitary survey report include:

1. An evaluation of all actual and potential sources of pollution,
2. An evaluation of the hydrography of the area and
3. An assessment of water quality. Complete intensive sanitary surveys are conducted every 12 years with interim narrative evaluations completed on a three year basis. If major changes to the shoreline or bacterial quality occur, then the intensive report is initiated prior to its 12 year schedule.

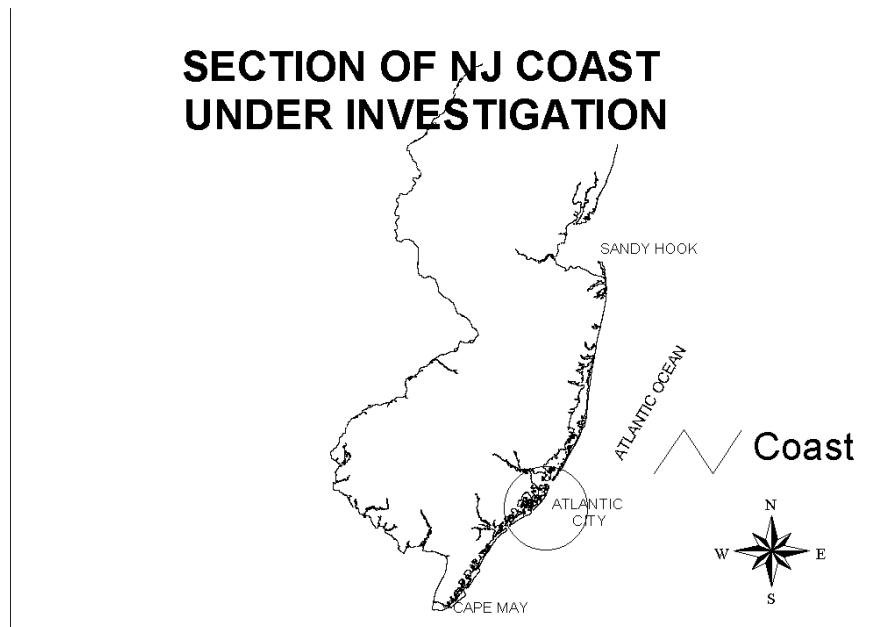
The following narrative constitutes this bureau's assessment of the above mentioned components and determines the current classification of the shellfish growing waters.

DESCRIPTION

The ocean shellfish growing waters covered by this Reappraisal include approximately ten miles of coastline from Peck Beach on the south to Brigantine on the north, and offshore to the state's three mile jurisdictional limit. (Please be advised that "miles" in this report are in the

nautical measure, whereby, one nautical mile equates to 6,076 feet). This area is also displayed on Chart 7 of the current Shellfish Growing Water Classification Charts.

**Figure 2:
Location Map**



The most recent Sanitary Surveys for Area 44 and Area 45 covered the periods 1975 through 1987, and 1981 through 1987, respectively, and found the following:

1. A 140 acre Prohibited area along Ocean City's shoreline and a 250 acre Prohibited area in the vicinity of Absecon Inlet and adjacent to Atlantic City's shoreline were required to act as a closed safety zone between the storm water discharges and the region's Approved waters.
2. Except for the immediate vicinity of the storm water discharges, rainfall runoff did not significantly impact these areas with high coliform levels.
3. The Atlantic County Utilities Authority's (ACUA) waste water treatment plant (WWTP) did not significantly impact the Approved waters bordering the closed safety zone surrounding the facility's outfall.
4. No dimensional adjustment to the size of the 3,600 acre closed safety zone surrounding the above outfall was warranted.
5. The Approved waters contained within these areas continued to meet that designation.

Subsequent Reappraisals covering the time periods 1988 to 1989 and 1990 to 1993, found the Sanitary Surveys to be still representative of the areas' conditions and recommended that the current classifications remain in effect (See below). In addition, the Reappraisals concluded the following:

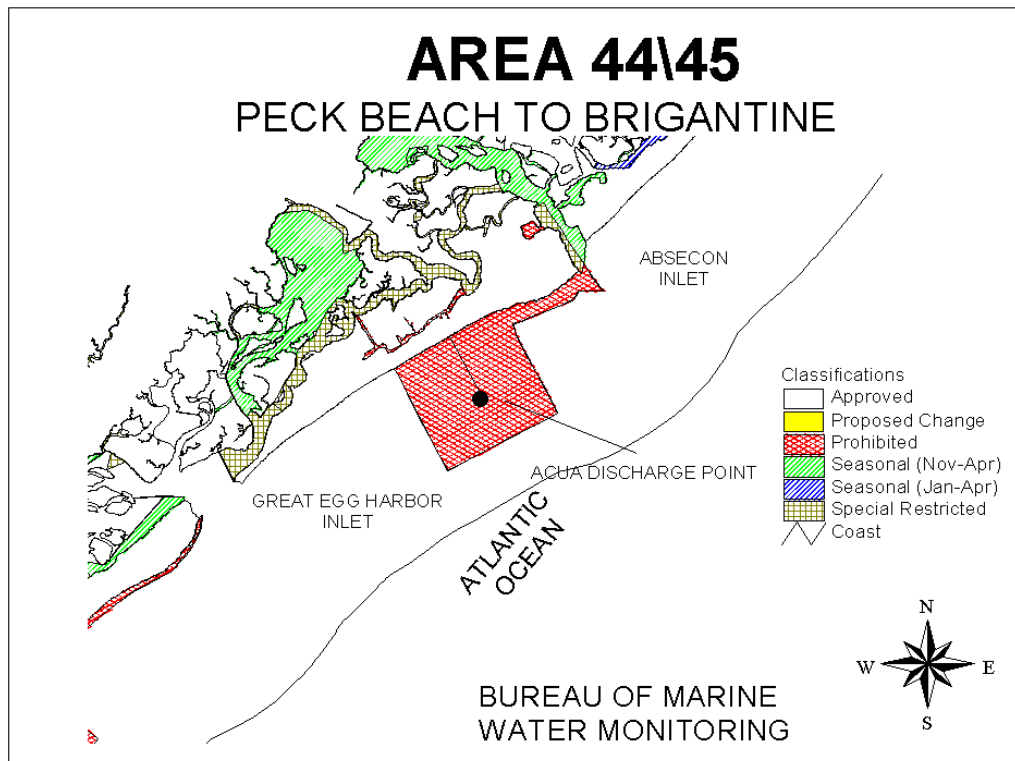
1. Calculated that if the ACUA's WWTP were to malfunction, the state would have a minimum of five hours to stop harvesting in the Approved waters surrounding the outfall closure. It was also found that this would be sufficient time for this Bureau to take the necessary actions to accomplish this task.
2. Besides assimilating rainfall runoff contaminants, the closures surrounding Atlantic and Ocean City's storm water outfalls are needed to buffer the adjacent Approved waters from occasional raw sewage spills resulting from collection system overflows.
3. The immediate and mandatory notification system to state agencies of a sewage overflow as in the case of collection system operations, or of a plant malfunction or effluent overload as in the case of ACUA's WWTP, is operating in a satisfactory manner.
4. With only minor and non-health significant exception in the vicinity of Absecon Inlet, rainfall runoff does not impact the Approved waters of this region with elevated coliform levels.

The Approved waters are available for harvesting surf clams (Spisula solidissima) and blue

mussels (Mytilus edulis) by dredge boats licensed by the Division of Fish, Game and Wildlife. Surf clams for bait purposes only (non-human consumption) can also be harvested from Prohibited areas under a special program administered by this bureau and enforced by the Division of Fish, Game and Wildlife.

For 1995, surf clams yielded 46.3 million pounds of meats in New Jersey for an exvessel value of \$27.4 million. In addition to being the State's largest molluscan fishery, New Jersey historically leads all other surf clam producing states in total landings.

Figure 3: Current Classifications



METHODS

Water sampling was performed in accordance with the Field Procedures Manual (NJDEP, 1992).

Approximately 400 water samples were collected for total and fecal coliform bacteria between 1992 and 1996 and analyzed by the three tube MPN method according to APHA (1970). Figure 4 shows the shellfish growing water quality monitoring stations in Area 44-45. Twenty stations were monitored during each year.

Water quality sampling, shoreline and watershed surveys were conducted in accordance with the NSSP Manual of Operations, Part I, Appendix B (USPHS, 1992).

Data management and analysis was accomplished using database applications developed for the Bureau. Mapping of pollution data was performed with the Geographic Information System (GIS:ARCVIEW).

BACTERIOLOGICAL INVESTIGATION AND DATA ANALYSIS

The water quality of each growing area must be evaluated before an area can be classified as *Approved*, *Seasonally Approved*, *Special Restricted*, or *Seasonal Special Restricted*. Criteria for bacterial acceptability of shellfish growing waters are provided in Part I of National Shellfish Sanitation Program Manual of Operations - 1995 Revision. Each shellfish producing state is directed to adopt either the total coliform criterion, or the fecal coliform criterion. While New Jersey bases its growing water classifications on the total coliform criterion, it does make corresponding fecal coliform determinations for each sampling station, these data are viewed as adjunct information and are not directly used for classification. The State Shellfish Control Authority also has the option of choosing one of the two water monitoring sampling strategies for each growing area.

The Adverse Pollution Condition Strategy requires that a minimum of five samples be collected each year under conditions that have historically resulted in elevated coliforms in the particular growing area. The results must be evaluated by adding the individual station sample results to the preexisting bacteriological sampling results to constitute a data set of at least 15 samples for each station. The adverse pollution conditions usually are related to tide, and rainfall, but could be from a point source of pollution or variation could occur during a specific time of the year. Under this strategy, for *Approved* waters, the total coliform median or geometric mean MPN of the water shall not exceed 70 per 100 mL and not more than 10 percent of the samples exceed an MPN of 330 per 100 mL for the 3-tube decimal dilution test. For *Special Restricted* waters, the total coliform median or geometric mean MPN of the water shall not exceed 700 per 100 mL and not more than 10 percent of the samples exceed an MPN of 3300 per 100 mL for the 3-tube decimal dilution test. Areas to be *Approved* under the Seasonal classification must be sampled and meet the criterion during the time of the year that it is approved for the harvest of shellfish.

The Systematic Random Sampling strategy requires that a random sampling plan be in place before field sampling begins and can only be used in areas that are not affected by point sources of contamination. A minimum of six samples per station are to be collected each year and added to database to obtain a sample size of 30 for statistical analysis. The bacteriological quality of every sampling station in *Approved* areas shall have a total coliform median or geometric mean MPN not exceeding 70 per 100 mL and the estimated 90th percentile shall not exceed an MPN of 330 per 100 mL. For *Special Restricted* areas, the bacteriological quality shall not exceed a total coliform median or geometric mean MPN of 700 per 100 mL and the estimated 90th percentile shall not exceed an MPN of 3,300 per 100 mL.

Since this shellfish growing area contains a discharging WWTP outfall, the adverse pollution condition strategy was used to classify the waters.

MARINE BIOTOXINS

The Department collects samples at regular intervals throughout the summer to determine the occurrence of marine biotoxins. This data is evaluated weekly by the Bureau of Marine Water Monitoring in accordance with the NSSP requirements. An annual report is compiled by the Bureau of Freshwater and Biological Monitoring.

SHORELINE SURVEY

Atlantic County Utilities Authority waste water treatment plant's outfall remains the most significant point source of pollution affecting this area. The latest visit to this facility occurred on September 26, 1997, and is summarized below. (A detailed checklist is contained in Attachment I).

Plant flows average 32 MGD during the summer or approximately 80% of the design 40 MGD flow while winter flows average 28 MGD or approximately 70% of design. These flows are only a couple percent higher than those experienced in 1990, even though the Authority had increased its service area in 1991 and 1992 with the completion of the Egg Harbor City force main and the "Coastal Alternative" Interceptor, respectively. The Coastal Alternative Interceptor provides for wastewater conveyance from areas reaching from Mays Landing to the treatment plant. Much of this minor flow increase during this seven year period can be attributed to Atlantic City Sewerage Company's concerted effort to reduce the amount of inflow/infiltration (I/I) by upgrade its collection system. Prior to these improvements, Atlantic City contributed approximately 50% of the plant's total flow. This has since been reduced to approximately 43% of the total flow.

Although plant flows are well within the designed capacity, the facility experiences hydraulic overloading from prolonged heavy rains in combination with tidal flooding of low lying coastal sewered areas. This is especially true in sections of Brigantine, Ventnor and Margate. If, during these conditions, the plant flows are 55 MGD or over for three or more hours, the plant operator will consider bypassing portions of the aeration tank in order to keep the activated sludge's microbial population at a productive concentration. One incident of this nature occurred on September 25, 1992, during Tropical Storm Danielle. It is important to note that the state was immediately notified of the situation in this case and several subsequent events by the plant operator. Although effluent quality is not optimum during these episodes, the facility has at least the extra chlorine dosage capability to disinfect this added flow. Since 1995, however, the plant has practiced returning an extra amount of secondary tank activated sludge to the aeration tanks during these periods to replace the diluted microbial biomass. So far, this procedure has enabled the facility to avoid bypassing the aeration basins even up to storms producing maximum peak flows of 75 MGD. This includes the August 1997 storm event when a record rainfall of 13.52 inches resulted in Atlantic County being declared a State of Emergency and produced the highest average monthly plant flow (35 MGD) since start-up in 1978.

Since the previous visit on November 9, 1990, the facility had added a sixth secondary

tank and switched from using pure gas/liquid chlorine to sodium hypochlorite (15% concentration).

Evaluated together, the plant's current operation does not warrant any modification to the current closure surrounding the outfall.

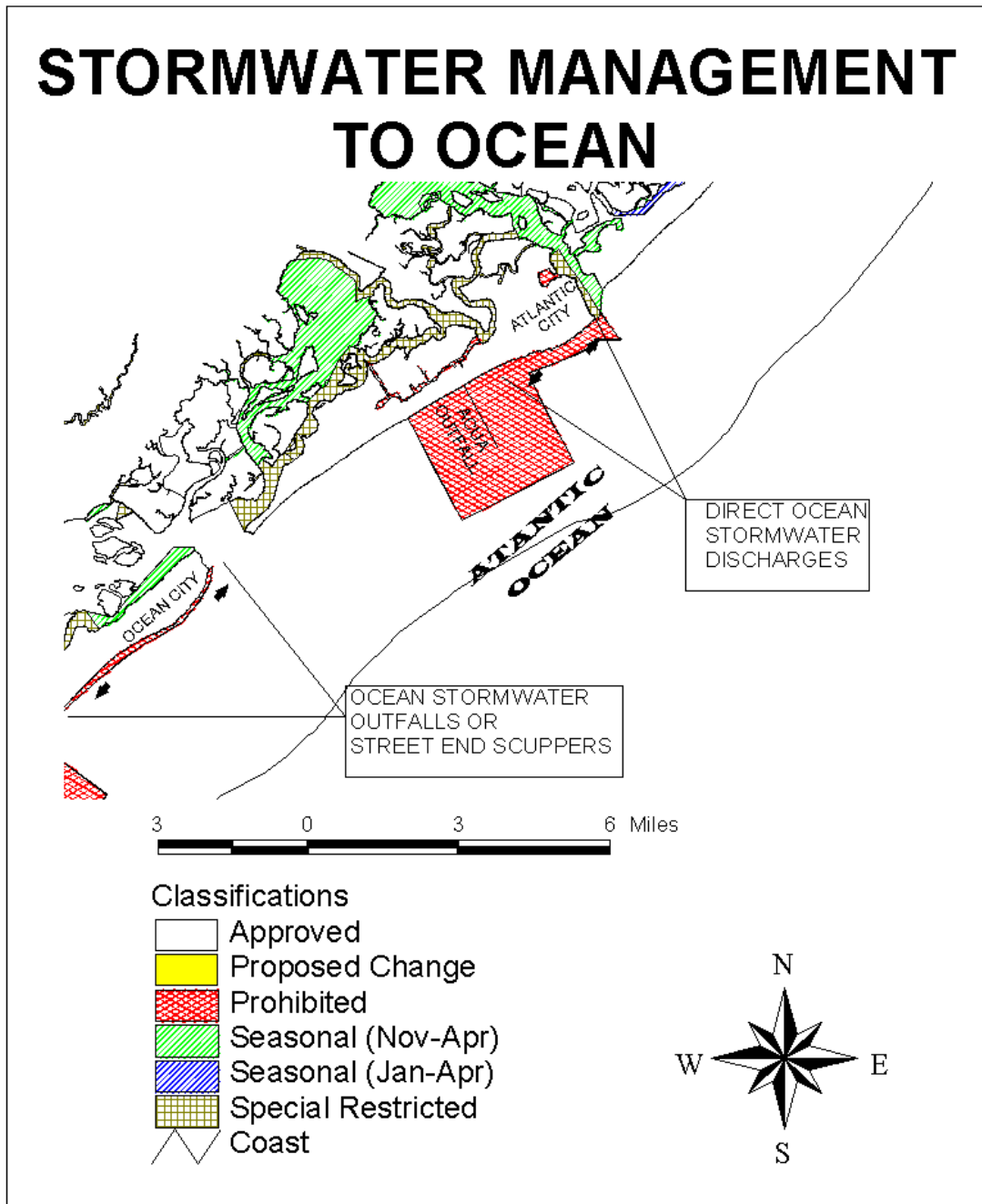
The ebbing waters from Great Egg Harbor and Absecon Inlets which are contained within shellfish growing water Areas SE2 and SE1, respectively, have the potential to carry backbay non-point contamination into Area 44-45. These sources include storm water runoff, fecal waste from the tidal marsh water fowl population, and overboard bilge and sewage discharges from boats. Prior investigations have shown these contaminants not to be a problem in the waters surrounding Great Egg Harbor Inlet and to have relatively minor significance on the ocean receiving waters outside of Absecon Inlet. The latter situation has been addressed by the establishment of a small closure at the mouth of the inlet.

In addition to protecting the Approved waters from the detrimental effects of rainfall runoff, the need for the closed safety zones surrounding Ocean City and Atlantic City's direct ocean discharging storm water drains is further demonstrated by relatively frequent sanitary sewage system overflows going into the storm water drainage system. For example, on October 9, 1994, the Department's Communications Center ("Hot Line") reported an estimated 1000 gallon raw sewage overflow from an Atlantic City commercial establishment that entered into a ocean discharging stormdrain.

Another example was a similar incident occurring in Ocean City on May 15, 1996, when 500 gallons of raw sewage from a overflowing manhole was received by the ocean via a stormdrain. As in the case with the WWTP aeration tank bypasses, these incidents as well as others were immediately reported to the state. This fast response time is a crucial factor in the Bureau's ability to insure that no sewage contaminated shellfish are harvested.

The location of these ocean storm water outfalls serving the region under investigation are shown below.

Figure 4: Stormwater Discharges



HYDROGRAPHY AND METEOROLOGY

Detailed hydrography studies were performed in the vicinity of ACUA's outfall in 1977 and 1978, and are reported in the Area 45 Sanitary Survey, 1977-1979. There have been no significant changes in hydrography since. Precipitation inputs and environmental conditions to the area for the sampling period 1992 through 1996 are shown in the Table below. The primary weather station for this area is the National Oceanic and Atmospheric Weather Station located at Atlantic City Airport. The secondary weather station for this area is the Senator Farley Marina, Atlantic City. The secondary station data is used when data from the primary station are incomplete.

Table 1 : Climatological Data

**Rainfall Recorded at NOAA's Atlantic City Airport Station
at 2400 Hrs; Wind and Temperature aboard sampling
vessel at time of sample collection**

| Sampling Date | Precipitation in Inches | | | | | Wind | | Temperature | |
|---------------|-------------------------|---------------|---------------|---------------|------|---------|--------------|-------------|----------|
| MO/DAY/YR | SAME DAY | PRIOR 24 HRS. | PRIOR 48 HRS. | PRIOR 72 HRS. | | DIRECT. | VELOC KNOTS. | AIR °C | WATER °C |
| 3-5-92 | 0 | 0 | T | 0 | | SW | 4 | 8 | 5 |
| 3-25-92 | 0 | 0 | 0 | .27 | | SW | 10 | 8 | 4 |
| 6-17-92 | 0 | 0 | 0 | 0 | | S | 6 | 21 | 19 |
| 7-7-92 | 0 | .04 | 0 | .47 | .45 | N | 6 | 22 | 19 |
| 5-3-93 | 0 | 0 | 0 | 0 | | E | 10 | 15 | 11 |
| 5-6-93 | .02 | .05 | T | 0 | | SW | 4 | 20 | 13 |
| 5-12-93 | .41* | 0 | 0 | 0 | | S | 8 | 20 | 13 |
| 1-25-94 | .08 | 0 | 0 | 0 | | W | 4 | 10 | 0 |
| 2-17-94 | 0 | 0 | 0 | 0 | | W | 4 | 3 | 2 |
| 3-7-94 | 0 | 0 | 0 | T | 1.43 | SW | 8 | 7 | 2 |
| 7-17-95 | .37 | .18 | 0 | 0 | | S | 8 | 28 | 24 |
| 8-2-95 | 0 | 0 | 0 | 0 | | S | 8 | 28 | 27 |
| 9-19-95 | T | 0 | 2.17 | .20 | | - | - | - | - |
| 11-6-95 | 0 | 0 | .04 | .07 | | - | - | - | - |
| 8-12-96 | .53* | 0 | 0 | .34 | | - | - | - | - |
| 8-28-96 | 0 | 0 | 0 | 0 | .25 | - | - | - | - |
| 9-16-96 | 1.21* | 0 | .01 | .39 | | - | - | - | - |

* Fell after sampling.

Shaded boxes indicate rainfall data used in analysis

WATER QUALITY STUDIES

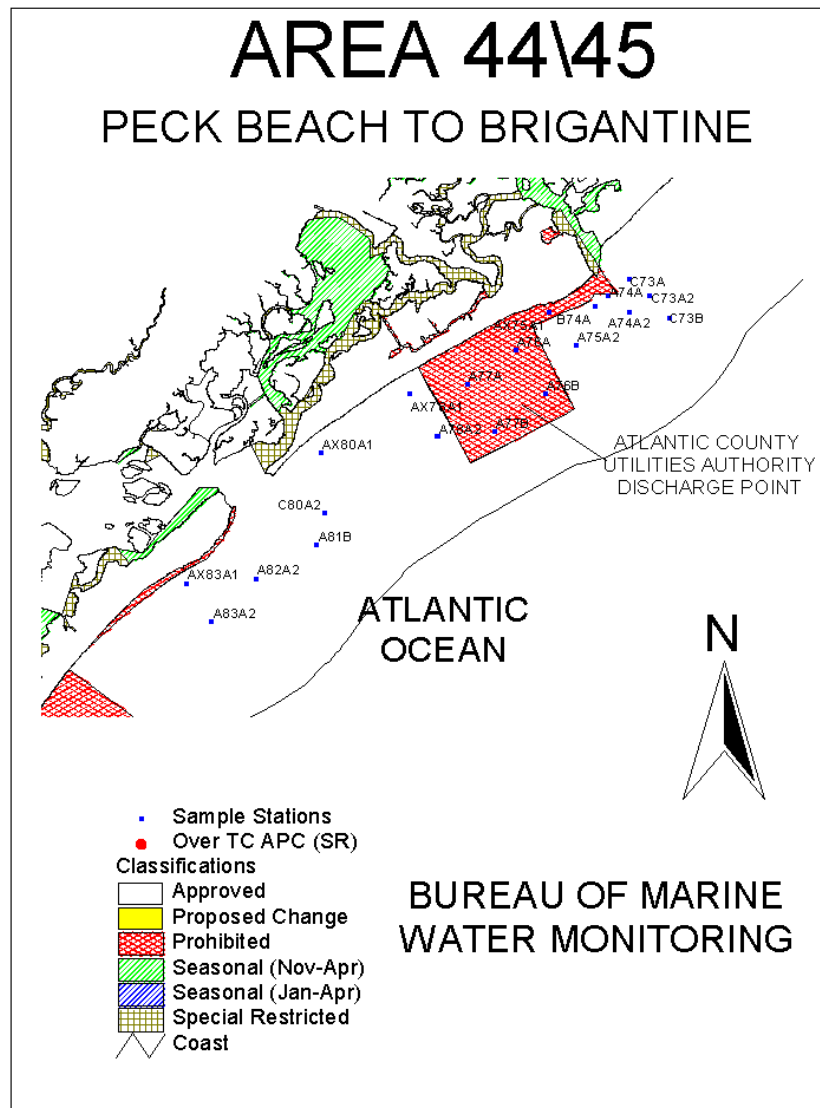
As noted above, the adverse pollution condition strategy was utilized to classify the waters contained within this area.

Water sampling for analysis was conducted on 17 different occasions. Personnel cutbacks

and sampling vessel downtime resulted in only ten sample runs being collected instead of the 15 scheduled for 1994, 1995 and 1996. Therefore, the reporting block of data used was extended back to 1992 to slightly exceed the minimum 15 sets of samples required for analysis. It should be mentioned that the Bureau has since acquired two new reliable ocean sampling vessels and additional personnel to accomplish this mission.

The below chart shows the location of the 20 sampling stations used during the investigation.

Figure 5: Sampling Stations - locations of the 20 sampling sites for this report



All stations were sampled on the surface and four of these stations (all surrounding ACUA's outfall) were sampled on the bottom as well. In all, a grand total of 406 samples were analyzed for both T.C. and F.C. (A complete tabulated listing of the bacteriological data is contained in Attachment II).

All stations (both surface and bottom) exhibit acceptable (Approved) water quality by having all medians recording 3.6 or less and only one station (Bottom Station A76A)

exceeding the percentile portion of the criteria (2.5% greater than the 10% allowable limit).

INTERPRETATION AND DISCUSSION OF DATA

Seven sample collections or 41% of the total number of runs, were conducted after a rainfall event as measured at the National Oceanic and Atmospheric Weather Station located at Atlantic City Airport. Surface Stations A74A and B74A recorded T.C./F.C. levels of 1100/9.1 and greater than 2400/23, respectively, on July 7, 1992, after a 96 hour accumulative rainfall of approximately one inch. Since these stations are located within a 0.5 mile radius of Absecon Inlet, these scores were probably associated with a backbay coliform source. While these T.C. counts were among highest encountered during the entire reevaluation, they do not represent a significant public health concern since both corresponding F.C. levels were relatively low. Although possibly related to the ACUA outfall's discharge, the same date sample at Surface Station A77A with a T.C./F.C. level of 210/less than three was probably more associated with this 96 hour accumulative rainfall occurrence than the plant's effluent. In any event, Station A77A is well contained within the current closed safety zone surrounding the outfall.

With two exceptions, the data from the four stations surrounding ACUA's outfall (Stations A76A, A76B, A77A and A77B) show the WWTP's effluent continues to be adequately disinfected. Excluding the rainfall related July 7, 1992 T.C. level at Surface Station A77A, August 12 and 28, 1996, sample runs produced several elevated T.C. counts at Bottom Stations A76A and A77B. The elevated T.C. levels (one greater than 2400) that also made Bottom Station A76A out of compliance implicate ACUA's discharge as the high count source. However, a record review of outfall chlorine residuals, suspended solids, F.C. levels and other parameters for August 1996, show the effluent to be well treated during this period. Mr. William Hiller Jr., Director of Operations, recalls no operational or equipment problems that would have degraded effluent quality occurring during this time frame. It should be noted, however, that this pollution occurrence (whatever the cause) occurred when the State's surf clam season was closed to harvesting. This season begins on October 1 and extends through and including May 31; (N.J.A.C. 7:25-12.8) and, as a consequence, the event had minimal public health significance.

Sampling Stations AX75A1 and AX83A1 are in close proximity to the stormdrains located in Atlantic City and Ocean City, respectively. These stations demonstrate, by the low T.C. /F.C. levels recorded (9.1 or less) that the closed safety zones surrounding the storm water drains are of sufficient size to protect the adjacent Approved waters.

Aside from the July 7, 1992, sample collection, the lack of high coliform values encountered at the sampling sites surrounding both Absecon and Great Egg Harbor Inlets indicate that backbay pollution sources, i.e.; marinas, stormwater runoff, water fowl, etc., are not a major coliform contribution to the Approved waters of Areas 44 and 45.

CONCLUSIONS

The following is concluded:

1. The Approved waters contained within this region continue to meet the NSSP's criteria for that classification.
2. Atlantic and Ocean City's stormwater outfall closures continue to be warranted to assimilate rainfall runoff contaminants and an occasional minor raw sewage spill before impacting the adjacent Approved waters.
3. The ACUA's WWTP is equipped and operated in a manner to provide a consistent quality effluent under most environmental conditions.
4. Sewage collection overflows and WWTP system problems continue to be reported to the appropriate state agencies in a timely and satisfactory manner.
5. The effluent from ACUA's outfall is not impacting the ocean receiving waters with elevated T.C. coliform levels during the State's surf clam season.
6. The closure surrounding ACUA's outfall continues to be adequate in size and does not require dimensional adjustment.
7. With only a minor and non-health significant exception in the vicinity of Absecon Inlet, rainfall runoff does not impact the Approved waters of this region with elevated coliform levels.
8. With the same exception noted above (Conclusion #7), any non-point pollution sources associated with the backbay regions are not a detrimental factor to the area's Approved waters surrounding Absecon and Great Egg Harbor Inlet.
9. Although the time frame of this report needed to be expanded to include older data, it is still representative of the sanitary conditions in the area under investigation.

RECOMMENDATIONS

It is recommended that the shellfish growing water classifications as delineated for this area in the Rules and Regulations for Shellfish Growing Water Classification, N.J.A.C. 7:12-2.1(a)20, effective January 5, 1998, remain unchanged. These classifications are as follows:

- v. All of the ocean waters inshore of a line beginning at the light chartered as F1 G 4sec 29ft 6M "7" at the end of Absecon Inlet's southwest jetty and bearing

approximately 017 degrees T towards the ocean end of Absecon Inlet's northeast jetty until it intersects a line bearing approximately 148 degrees T (reciprocal 328 degrees T) from the center span of the Vincent Haneman Bridge (Route 87). This point of intersecting lines has coordinates of latitude 39 degrees 22.0 minutes N., longitude 74 degrees 24.4 minutes West, then proceeding in a southeasterly of latitude 39 degrees 21.5 minutes N., longitude 74 degrees 23.9 minutes W. (generally marked by a buoy charted as R. "2" F1 R 2.5s), then bearing approximately 275 degrees T (reciprocal 095 degrees T) for approximately 0.5 nautical miles towards the outermost tip of Garden Pier, Atlantic City, until it is 0.25 miles directly offshore, then parallel along the shoreline in a southwesterly direction, 0.25 nautical miles offshore, for approximately 1.3 nautical miles until it intersects a line bearing approximately 153 degrees T from the center of Convention Hall, Atlantic City, then proceeding in a southeasterly direction along that line for approximately 1.75 nautical miles to a point with coordinates of latitude 39 degrees 19.4 minutes N., longitude 74 degrees 25.1 minutes W., then from this point which is approximately 2 nautical miles offshore, the line runs parallel to the shoreline in a southwesterly direction for approximately 2.1 nautical miles to a point with coordinates of latitude 39 degrees 18.4 minutes N., longitude 74 degrees 27.5 minutes W., then bearing approximately 333 degrees T (reciprocal 153 degrees T) for approximately 1.9 nautical miles to the outermost tip of Ventnor City Fishing Pier located at the Boardwalk and South Cambridge Avenue, City of Ventnor, then along that pier to the shore and terminating. This closure adjoins those Special Restricted waters defined in N.J.A.C. 7:12-3.2(a) 23i;

vi. All of the ocean waters inshore of a line beginning at the base of the jetty located on the beach near the intersection of Seaspray Road and Waverly Boulevard, City of Ocean City (first stone jetty projecting into Great Egg Harbor Inlet on the northeasternmost end of the city), and continuing along that jetty in a southeasterly direction to its outermost tip, then in a general southerly direction, the line continues and connects the tips of the stone jetties projecting into the ocean until reaching the tip of the stone jetty located at the end of the 15th Street (just south of the Ocean City Fishing Club Pier), then bearing approximately 230 degrees T for approximately 2.8 nautical miles to the water tank located at 4600 Haven Avenue (46th Street intersects across from this location), Ocean City, with coordinates of latitude 39 degrees 14.3 minutes N., longitude 74 degrees 37.6 minutes W., and terminating;

It is further recommended that the additional sampling resources acquired by this Bureau since this report be utilized to obtain the required number of backlogged and future sample runs.

LITERATURE CITED

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ACKNOWLEDGMENTS

This report was written under the direction of William J. Eisele, Jr., Chief, and James E. Mumman, Administrator. Robert Connell assisted in statistical and GIS data analysis. Deborah Watkins assisted in data retrieval. Thanks is given to Bonnie Zimmer for her help in persuading the different computer software programs into producing one unified document. Special acknowledgment is given to Captain Joseph Rommell and Joseph Buzby for collecting shellfish water quality samples in the ocean during this time frame. This study would not have been completed without the analytical capabilities of our microbiology laboratory staff, including Eric Feerst, Supervisor, Bruce Hovendon and Bob Seabrook.

Special recognition is also given to William Hiller Jr., Director of Operations, for representing ACUA and providing the information and material that assisted in making these shellfish growing waters reclassifications possible.

ATTACHMENTS

Attachments listed in the text of this document are **not** available for download.